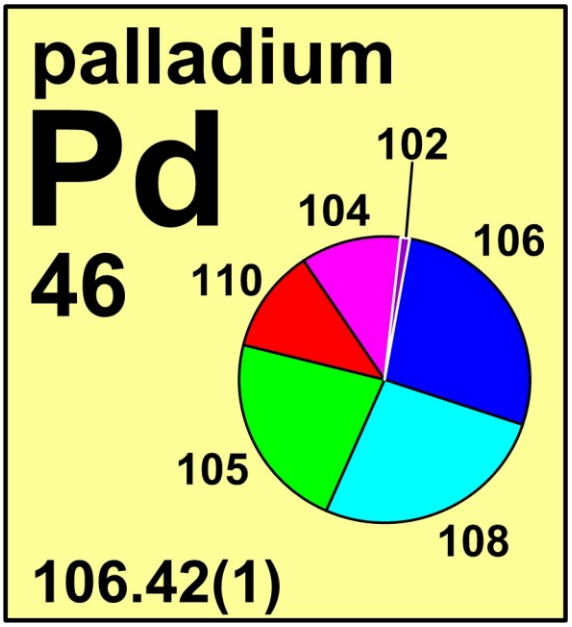
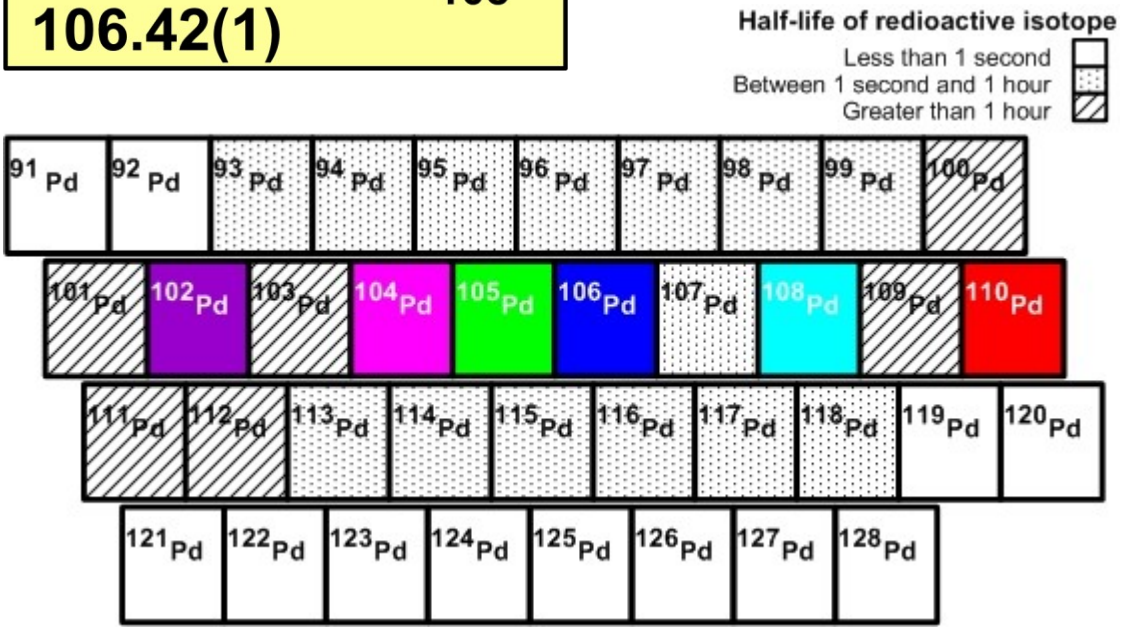
palladium



Stable isotope	Atomic mass*	Mole fraction
^{102}Pd	101.905 609	0.0102
^{104}Pd	103.904 036	0.1114
^{105}Pd	104.905 085	0.2233
^{106}Pd	105.903 486	0.2733
^{108}Pd	107.903 892	0.2646
^{110}Pd	109.905 153	0.1172

* Atomic mass given in unified atomic mass units, u.



Important applications of stable and/or radioactive isotopes

Isotopes in geochronology

1) The ratio of ^{107}Pd/^{107}Ag is used in methods of geochronology to help date major thermal events in the solar system. ^{107}Pd has a half-life of about 6.5 million years and decays via beta decay to ^{107}Ag. If both ^{107}Pd and excess ^{107}Ag (^{107}Ag is also abundant naturally) are present in the sample, the material would have formed sometime after the half life of ^{107}Pd (6.5 million years) and the ratio of ^{107}Pd/^{107}Ag can be measured and used to help determine the starting point of that decay process and thus the formation of the cosmic material.

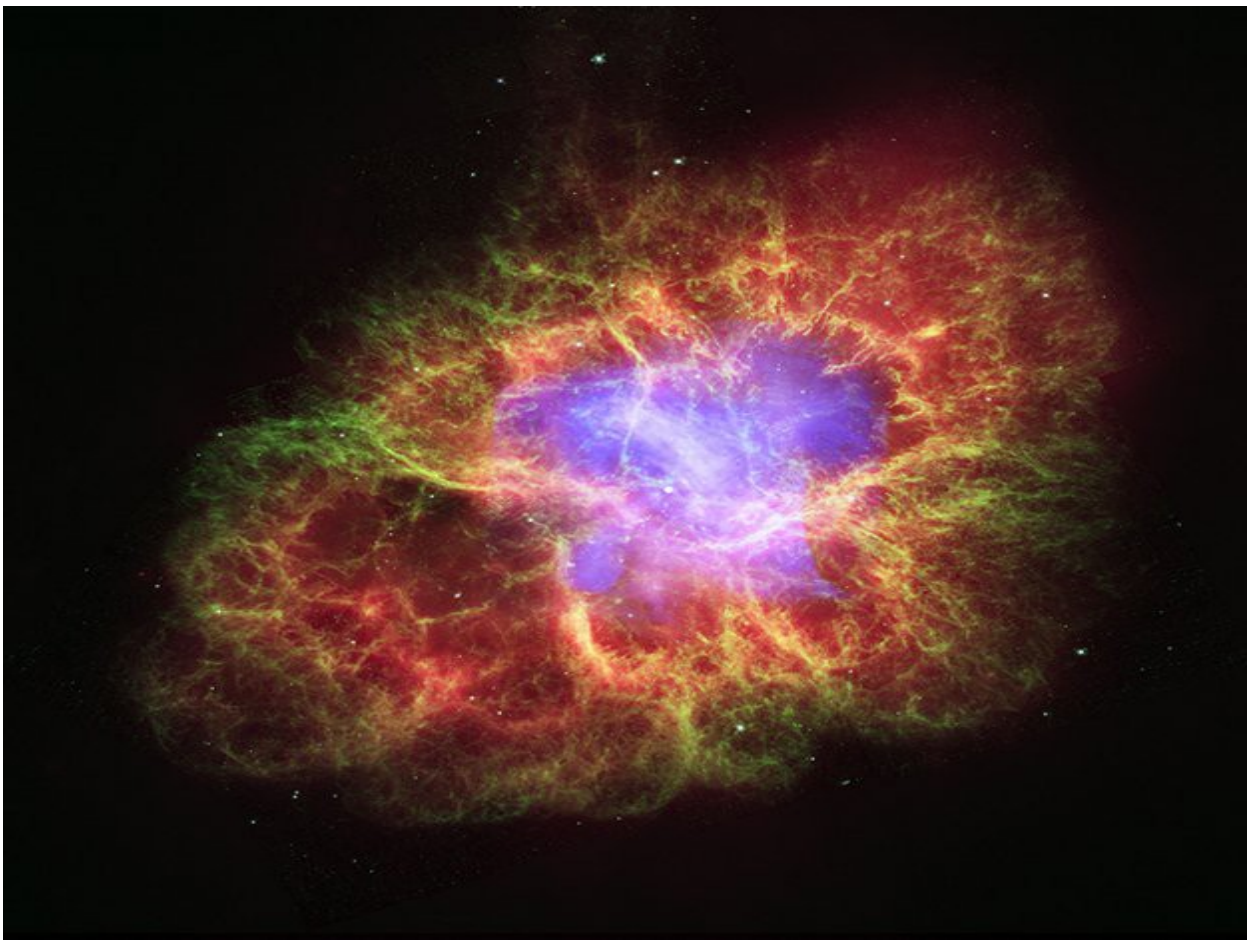


Figure 1: The crab nebula seen above is an example of an exploding star which is responsible for the release of heavy elements like ^{107}Pd in to space.

Isotopes in medicine

1) ^{104}Pd is used to produce radioactive ^{103}Pd seeds to fight prostate cancer.
2) ^{108}Pd can be used to produce radioactive ^{109}Pd for use in cancer therapy.